DOCUMENT RESUME

ED 027 167 RE 001 562

By-Svagr, Virginia

Teaching Upper Elementary Students With Severe Learning Disabilities.

Oakland Unified School District, Calif.
Pub Date Dec 68
Note-60p.
EDRS Price MF-$0.50 HC-$3.10
Descriptors-Arithmetic, Attention Control, Behavior Development, *Dyslexia, Group Dynamics, *Instructional Programs, *Intermediate Grades, *Learning Difficulties, Logical Thinking, Operant Conditioning, Reading Skills, Social Studies, Teaching Techniques, Writing Skills

A program for intermediate-grade children (4, 5, and 6) with severe learning disabilities is described. The typical student involved in the program has been unsuccessful in a regular classroom, has had special help with reading, does not fit the criteria for any special education program, and has average or above-average intelligence. The program objectives, the skills taught, and the teaching methodology are described. Also described are the materials employed, the architectual requirements, and the backup services. A multidisciplinary analysis of the program and evaluation of each student are emphasized. Charts, tables, and a bibliography are included. (RT)

ED027167

Teaching Upper Grade Students

TUGS

"His appearance is normal,

His intelligence is average or better,

He receives love and attention;

Yet, he is a menace to his neighbors,

A disruptive influence in the regular classroom,

An unsolved puzzle to his parents."

Prepared for Oakland Schools by

VIRGINIA SVAGR, Ph. D.

December, 1968

RE 001 562

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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OAKLAND SCHOOLS
READING AND LANGUAGE CENTER

TEACHING UPPER ELEMENTARY STUDENTS WITH SEVERE LEARNING DISABILITIES

Virginia Svagr, Ph. D.

Statement of the Problem

Compulsory school attendance laws coupled with the rapidly decreasing number of jobs for those with no secondary education place severe pressures on young people to remain in school. Within the memory of most adults, young people who were unable to succeed in school stopped going to school. They might take a job as a maid or a busboy. Hard work and a cooperative personality would result in promotion and success. However, the adults in our population who joined the working force in that way appear to be unanimous in their demand that their children have a "good" education. They have experienced the process of pursuing success "the hard way" and the heartbreak of watching the younger, better-educated worker slip into the more desirable positions. They demand that schools teach their children so that they will have easier access to the "good" things in life. The adults who stayed in school and acquired an education are equally aware of its contribution to the success of their efforts. This belief in the absolute necessity of education for our young people is strengthened by well-publicized statements such as those made by Francis

Keppel before the House of Representatives Subcommittee on Education in 1963.

> One out of ten workers who failed to finish elementary school is unemployed today. Jobs filled by high school graduates rose thirty percent. While jobs for those with no secondary education decreased 25 percent in the last decade.

Keppel focused the problem even more specifically by stating:

> Almost a million youth drop out of elementary and secondary schools each year. Of these, 250,000 fail to complete elementary school. . . . One out of every three students in the fifth grade now, drops out of school before high school graduation. (Keppel, 1963)

The aggregate of these forces demanding a "good" education for every American child places great pressure on every educator and every student in our educational system.

Students at each grade level, K-12, are reminded almost daily by their teachers and parents of the serious consequences of failure in school. Unfortunately the knowledge of the existence of danger does not prevent it. The result of the litany of "what will happen if" serves to increase the fear experienced by each child whenever he is unsuccessful in school. The implication of the constant reminder of the result of academic failure is that the student who does not learn is willful or lazy or stupid. Such beliefs do not enhance the student's ability to improve his performance in school nor do they encourage the educator to seek a remedy for school failure. If the professional educator who is responsible for decision-making in the teaching↔learning process

as it exists in schools believes that the child can learn what is being taught if he tries, the educator will not believe that success will result from a change in teaching. This educator will search for reasons why the learner is failing and what the learner should do to improve his performance. In an effort to pinpoint the exact flaw in the learner, education has developed a complex system of differential diagnosis which is designed to identify those students who are unable to achieve in the regular classroom and can be taught in a special education classroom.

Traditionally the special education programs are based upon the etiology of the handicap. The selection of children for such programs requires that they meet the criteria which indicate that the child has the specific handicap for which the special class is designed to provide special treatment. The children who are failing to learn in a regular classroom and do not satisfy the criteria of a traditionally accepted etiology and therefore cannot be placed in special programs are examined by professionals in other disciplines in an effort to explain their apparent inhibition. These children are seen by pediatricians, neurologists, endocrinologists, psychiatrists, ophthalmologists, optometrists, psychologists, social workers, audiologists, and representatives of many other professional specialties. Their efforts result in diverse types of treatment which provide the specific remedy for some children and permit them to hold their own in the regular classroom. However,

there is a group of children who meet the criteria for no special educational classes and for whom these efforts have not brought success in the regular classroom. This is the population to which we will address this research study. A succinct statement of the problem is that there is a sizable group of children in regular classrooms with normal intelligence and no handicaps severe enough to account for the degree of their academic failure who may be able to learn successfully in regular classrooms if we change a portion of the teaching segment of the teaching $\longleftrightarrow$ learning process.

The term Learning Disability is the name which has been given the condition found among a large number of children who attend school regularly, appear normal to any observer, have average intelligence, have had several years of good teaching supplemented by individual or small group tutoring and have remained very nearly as illiterate as they were on the first day that they went to school. Ray H. Barsch, Ph. D. in the Department of Special Education at Southern Connecticut State College in New Haven has often referred to this group of children as the "walking wounded" in our schools. In a recent publication (1968) Barsch has extended the definition of this term to be:

> "a phenomenon of learning cutting across all ages and all populations. It is to be found at all levels where individuals must learn. It is a term to be applied to any learner who fails to benefit from an existing curriculum into which he has been placed. Anytime an original assumption of capability to benefit from curriculum is made, based upon tests or general

> education judgment and the learner fails, a learning disability is at work. All that is required is a failing learner (at any age or level) in a defined curriculum whose performance dictates a search for special methods of instruction which depart from standard procedures."

In the work that we have done we have identified the child with severe learning disabilities along the following dimensions:

1. He is more than ten years old.
2. He is markedly below grade level in reading, written composition, and arithmetic.
3. He has been tutored more than six months or been placed in a special education program, and has met with little or no success in conquering his learning problems.
4. He has a Full Scale WISC IQ score above 80.
5. His Performance subtest scaled scores on the WISC are high, including Block Design, but excluding Coding.
6. The scaled subtest scores on the WISC are characterized by wide scatter.
7. His Digit Span scaled score on the WISC is below 10.
8. There is demonstrable evidence that some functions controlled by the central nervous system are immature as compared to expected behavior for a child of his chronological age.

For every child that we have admitted to a special remedial program we have identified at least five other children, who resemble this child exactly on the criteria, and could serve as a control group to demonstrate what happens when a student like the one described is not placed in a special teaching program.

Since the number of children who are being considered is so very large, it is essential that the remedial program be one which is economically feasible. With the matter of cost always pressing against us we have made an effort to establish an inexpensive program which

will cause the boys and girls to learn in keeping with their intelligence. We are defining cause as whatever is necessary and sufficient to bring about the desired result. We are proposing at this time that future planning for girls and boys with severe learning disabilities be directed toward classes of twelve children in which a teacher will be assisted by an aide and will have the boys and girls in her classroom for two hours each day, four days per week. We believe that this is adequate intervention to bring about the desired achievement level among these severely handicapped students. It represents a moderate degree of change compared to a residential program of the type described by Gallagher (1960). It is markedly different from the full-time special classes in which seven children with perceptual deficits are taught by a teacher and an aide (Frostig, 1965; Lukens, 1967).

Since we have had success with removing boys and girls for a relatively short period of time from the classroom, we do not plan to move to a full-time remedial program. The structure as it has been proposed would permit a teacher to teach two sections of this type of class, if the teacher were willing to do so. This would mean that the teacher's load would then be twenty-four children with the assistance of an aide. This sort of class load could be justified economically when one considers the great need which exists for salvaging children of normal intelligence who are remaining functionally illiterate in the school setting as it exists today.

The model for the curriculum and the teaching method for this remedial program for dyslexic children is multidimensional. It is based upon theoretical knowledge available in the areas of perception, learning, communication, group dynamics, personality development and classroom management. The overall objective for the model is that these children for whom academic failure has become the daily expectation will function successfully in their regular classrooms. We are hypothesizing that the teaching techniques which will serve as the foundation for this success are those methods which will build academic skills along with appropriate classroom behavior. The focus of the teaching techniques which will be used will be to maintain the student's attention and to direct him into a series of learning activities. The learning activities will be characterized by two criteria: first, that the student can complete the task successfully if he tries; and secondly, that the sequence of the tasks is designed to move the student to grade level achievement in basic academic skills as rapidly as possible. The basic academic skills which we will attempt to teach are reading, written composition, arithmetic, knowledge in the area of social studies and science, the ability to think logically and rationally, and handwriting. The learning activities except for science will be scheduled consistently each day according to the following pattern:

9:15 to 10:15	Reading and written composition
10:15 to 10:45	Beverage break with sequencing for listening and speaking

10:45 to 11:15 Arithmetic

The content for the reading period will be the Silver-Burdett Social Studies Series with the children working with the grade level text which is consistent with their instructional reading level. The Harcourt, Brace Mathematics Series will be used for instruction in arithmetic with the students using the grade level text which is appropriate for their arithmetical knowledge and their reading ability. The students will have practice in academic skills each day with immediate knowledge of their level of success. The immediate correction of all work followed by reteaching when necessary will be basic to all program activities. Cursive writing will be retaught to our students using the programmed instruction which has been developed in our Reading Clinic and the form of handwriting paper which we have found helpful in improving the eye-hand coordination and spatial relationships of dyslexic students.

Science will be taught by means of field trips to the Cranbrook Science Institute to provide the students with life-like experiences with a single concept comprising the theme for each field trip. The resources of the science laboratory at Oakland Schools and films will serve also as sources of information for our students. The teachers will extend the concrete experiences with science information to the symbolic by assisting the students to read and write about the knowledge that they have acquired by seeing and feeling the real objects. The science

field trips will occur monthly. The logical and rational thinking will be taught and practiced during written composition and when the students are listening and speaking during the sequencing period.

Since the students have been in grades 4, 5, and 6, the program was named TUGS - Teaching Upper Grade Students.

The staff requirements for the TUGS program will be a certified experienced teacher who is knowledgeable in remedial reading techniques along with an aide. The aide will have "good general intelligence, the ability to establish good relations with children and others, familiarity with classroom routine, good physical condition, neat personal appearance, tact, courtesy, and good judgment" (Becker, 1968). The responsibilities of the aide will be those duties which will enhance the effectiveness of the teacher. The aide will observe the students as they carry out assignments made by the teacher. If a student turns to the wrong page or is answering the wrong questions, the aide may direct him to the correct assignment. If the student has not understood the assignment in the way the teacher explained it, the aide will stop the student from working incorrectly and will direct him back to the teacher so that reteaching can occur immediately. This function will require a high degree of skill on the part of the aide in order to control the student's impatience to get at his assignment and to prevent too many interruptions when the teacher is explaining material to the other students. A rule of thumb for differentiating teacher

responsibilities and aide responsibilities will be that the teacher is obliged to assess the students' needs and make the decisions about the ways in which the students are to be taught. Thus the teacher is the decision-maker; the aide carries out the teacher's directions.

The aide will assist the teacher to maintain the classroom in an organized fashion; she will take part in the preparation of materials which are to be used in the classroom; she will cooperate with the teacher in the supervision of the students on field trips or during activities which are supplementary to the teaching-learning situation such as arrival and departure from the building, lavatory and beverage breaks, and visits to the library or science room. The teacher and aide will meet together each day after the students return to their regular schools. They will review the morning, evaluate the session, and prepare the lesson plan for the next day. The teacher will be responsible for the development of the lesson plans and for the content of each day's assignment for each student. The aide will be responsible for supplying information which she has acquired in her observations of the students while they have been working. This information will supplement the teacher's knowledge of each student's functioning during the day's activities and assist the teacher to plan for the next day. The aide will work from 8:30 to 12:30 each morning. The aide will assist the teacher each morning to assemble the materials and equipment for the day's class.

The Rationale for the TUGS Program

The theoretical foundation for the TUGS program was derived from an eclectic selection of the specific elements of the theory available in the fields of perception, learning, communication, group dynamics, normal growth and development, motivation, and personality development. The selection of a particular item from a broad area such as learning was dependent upon the degree to which that concept would assist us to achieve the dual purpose for our students of appropriate classroom behavior and the acquisition of academic skills. The decision to continue to use a particular theoretical concept as a means to our objectives was based upon empirical pragmaticism. If we could observe the behavior which accompanied the use of the concept and if it was successful, we included it in the program. If we could only label the experience the student should have or if the students did not move toward our objective, that concept was dropped from the program.

The characteristic behavior of a TUGS student which interferes most with his ability to learn is his distractability. Cruickshank (1962) has described this as disinhibition or the inability to ignore any stimulus which chances to excite a sense organ. There are at least three major sources of theory which indicate the relationship of attention to learning. Solley and Murphy (1960) have developed a model of perception which indicates that attention is necessary for the formation of

percepts which determine one's concepts and behavior. Krech, in a paper presented at the U.S. Office of Education Conference on Innovation in Hawaii (1967), summarized the most recent findings and changes in electrochemistry, neurophysiology and neuroanatomy occurring in the brain during learning experiments. Krech pointed out that short term memory such as is measured by the Wechsler Intelligence Scale for children Digit Span Subtest is apparently an electrochemical response. It can be disrupted if the experimental organism's attention is directed to a new stimulus event before the short term memory has been converted to long term memory which is apparently a change in the structure of the nervous system itself. In order to produce retrievable information it is necessary that short term memory be converted to long term memory. Since our students were characterized by short attention span and inability to retain material which had been taught to them and which they had been able to repeat initially, it seemed that Krech was talking about the phenomenon which existed in our students.

The third area from which we acquired information about the process of attention was information about the reticular formation. Magoun's book, The Waking Brain, (1962), has lengthy explanations of the functions of the reticular system within the central nervous system. The reticular formation is a primitive alerting mechanism which transfers stimulation from all sensory neurons directly to the cortex. In

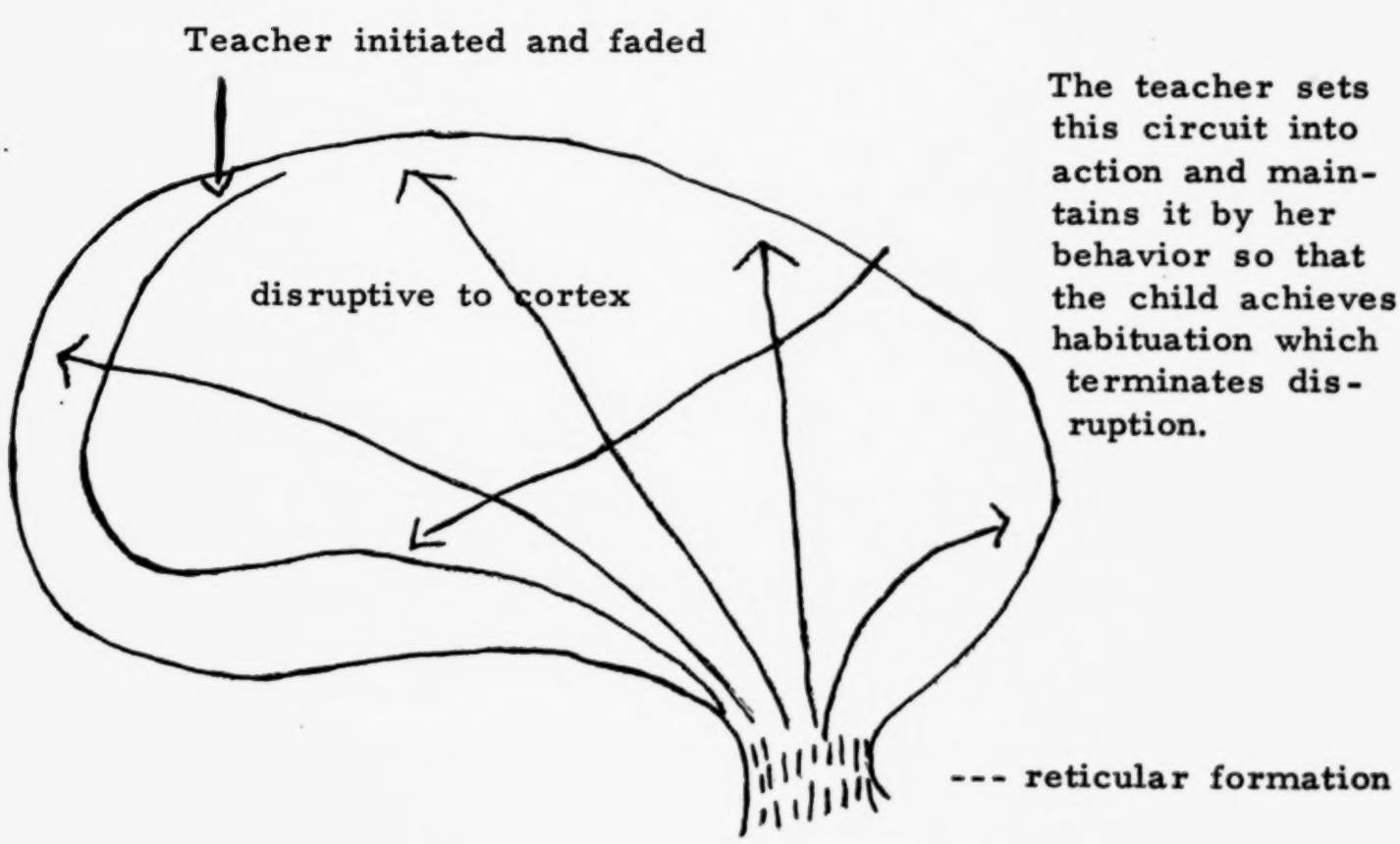
most humans much of the flow of stimulation entering through the sensory nervous system is dampened out through a process referred to as habituation. We experience this when we do not attend to the rings we wear or the watch that we have on all of the time, or even our shoes. The children that we are describing apparently are not able to become habituated to any stimulus which interrupts the one to which they are attending. Their attention literally jumps from one stimulus to another and thus impairs the conversion of the short term memory process to the long term memory process. We believe that this is one of the ways in which we can differentiate this type of child from an emotionally disturbed child. We describe the emotionally disturbed child as one who is capable of completing a long term memory process within his central nervous system. The problem in teaching this child is one of retrieval of information which he has already stored in his memory system. In the child who is called emotionally disturbed the high anxiety level interferes with his retrieval of information. When his anxiety can be allayed, we find that it is not necessary to begin teaching at the very beginning of school related knowledge.

In a child with a severe learning disability, however, there has been so much disruption of the process of consolidation of short term to long term memory that allaying anxiety in these children only makes it possible to teach them. They may enter the classroom quite disturbed and disturbing; however, the emotional disturbance in this type

of student is secondary to his inability to learn. When the anxiety has been allayed in this type of child, it can be demonstrated that academic knowledges and skills are not available to him. It is necessary to laboriously teach each aspect of each academic skill to these children. The most common beginning point with dyslexic children, no matter what their age, is a level of reading and ciphering which is ordinarily taught during the second half of first grade.

The process of habituation to stimulation patterns which should be secondary to the learning process which is going on in the classroom is the result of a process which can be compared to operant conditioning. We are hypothesizing that inhibition will result from feedback from the cortex to the reticular formation which provides the reticular formation with the information that it should not attend to this particular stimulus event. (Magoun, 1962) Establishing the conditioned behavior of failing to be interrupted by a stimulus event which has no relationship to the teaching that is being done in the classroom requires that this stimulation pattern become associated with one which brings about the desired response. In shaping the desired attending behavior and habituation to the disrupting stimulus, the classroom teacher will be responsible for interrupting and redirecting the student each time the student leaves the task which the teacher has set for him. The unconditioned stimulus is, of course, any stimulus to which the student is capable of responding, and the maladaptive behavior is

that of alerting or attending to each new stimulus that occurs. The learning task will be to bring about habituation to all stimulus events except those to which a particular teacher-selected cue is attached. Sketch I indicates the teacher's role in bringing the information to the cortex which can be translated into the habituation behavior which will dampen out the disrupted stimulus which is continually flowing to the cortex from the reticular formation.

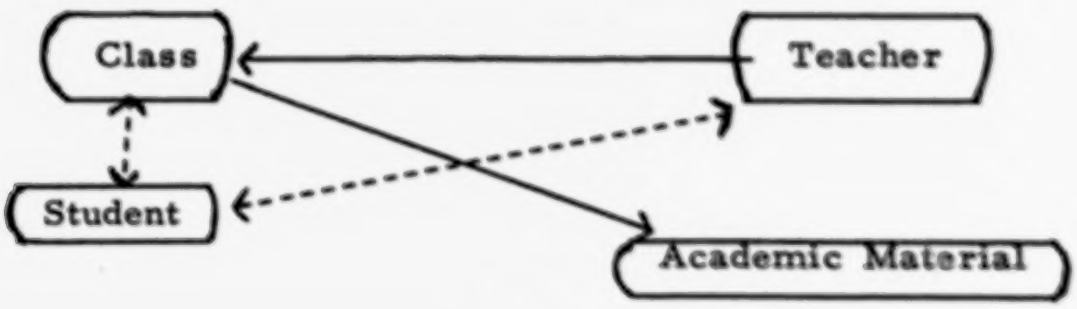

Teacher initiated and faded
disruptive to cortex
The teacher sets this circuit into action and maintains it by her behavior so that the child achieves habituation which terminates disruption.
--- reticular formation

Sketch I

The process of operant conditioning was used by our teachers in order to move the students from inappropriate, self-defeating behavior to cooperation and eagerness to learn. The teachers were continually informed that it was necessary for the boys and girls to be given the task of acquiring academic knowledge and skills at the level at which they could succeed. This is a very old concept in learning theory that you start with the learner where he is. It is one which can seldom be met in a general classroom since there is such divergence of individual achievement. The teacher's role in our class became that of simplifying material, repeating it until the student understood it thoroughly, helping the students to develop generalizations, and sequencing or imposing associations upon the children. Our definition of reinforcement was whatever maintained the desired response (Guthrie, 1935).

Another area of theory which utilized operant conditioning in order to bring about learning was the material from group dynamics (Bany and Johnson, 1963). The application of group dynamics theory to the inter-action which goes on in the classroom indicated that there are inter-actions other than those connected to the teaching-learning process which occur between students and between students and the teacher. In looking at the classrooms in which boys and girls with learning disabilities were found it appeared that the legitimate inter-actions that occurred in the classroom were those in which the teacher

interpreted knowledge to the student or directed the students so that they were able to inter-act adequately with knowledge in order to acquire whatever facts and skills they were expected to acquire in that particular day's assignment. In addition to these inter-actions there were inter-actions which we refer to as illegitimate. Those were the behaviors which the failing students had maximized in an effort to escape from the learning situation. These are inter-actions which occur between the student and other students, or between this student, other students and the teacher. These inter-actions are filled with emotional responses and serve to interrupt learning activities. Their chief function in a classroom is to use up time and to prevent the teaching-learning process from going in the way in which the teacher planned that it would go. The following diagram will illustrate these types of behaviors occurring in the classroom and also the functions of the teacher which are legitimate.



——— = teaching-learning process interactions
- - - = social interactions

Sketch II

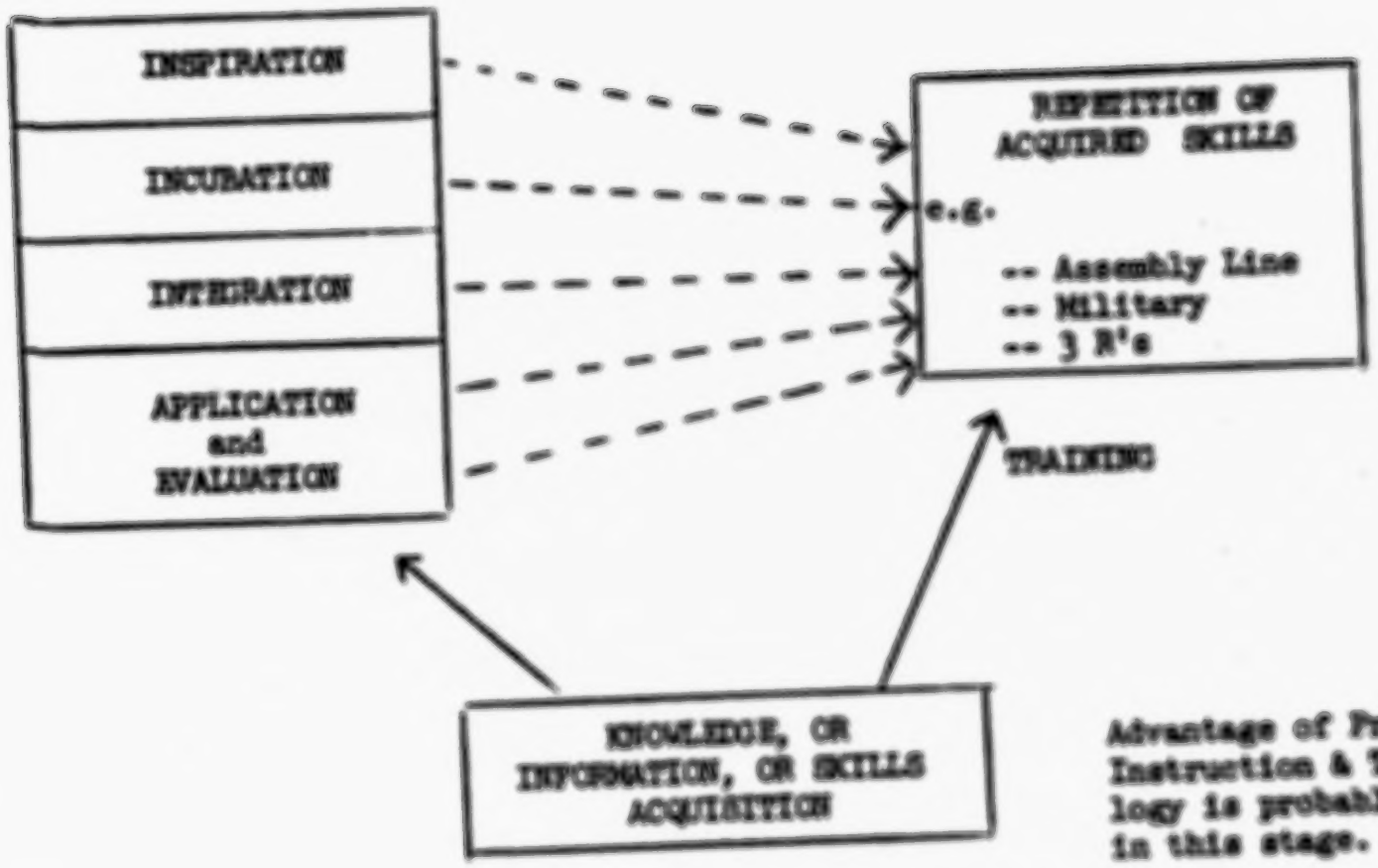
The interactions which occur between students and teachers and within students do serve an important function if we are concerned with educating children to become members of the human race. It would appear that these behaviors are necessary in order to teach the interpersonal relationships that promote a social climate that is conducive to the acquisition of knowledge and skills. I would suspect that these kinds of interactions could certainly be utilized to teach the attitudes and the cognitive processes that are more complex than the acquisition of knowledge. Finley Carpenter (1964) has developed a hierarchy of cognitive skills which would seem to indicate that the exclusive use of programmed instruction for children with severe learning disabilities would be inadequate for teaching them. Teachers are needed to talk and interact with these children in order to bring about the various levels in Carpenter's hierarchy. His model is presented on page 19 of this paper.

Solly and Murphy, Krech and Magoun provided us with an appreciation of the necessity of attention if learning is going to occur. We decided that the student's appropriate behavior was a necessary precursor to the process of maintaining attention to a learning task. As a result of our observations of the maladaptive behavior which our students were accustomed to using in a classroom, we formulated a list of behaviors called "Observable Behaviors". We stated these as terminal objectives for a successful teaching program and proceeded to teach our students to behave in accordance with these standards.

EDUCATIONAL AND TRAINING PROCESSES

"EDUCATED" MAN

Professional Person
Thoughtful & Creative



Advantage of Programed Instruction & Technology is probably greatest in this stage.

Adapted from models presented by Dr. Finley Carpenter, University of Michigan, and Dr. G. Wallas (Four Stages of Creativity).

The first of these behaviors is that the student comes to class with the appropriate equipment for the activities which are to occur in the class. This would mean that the student arrive at the place where he is to be taught, or where he is expected to carry out an assignment, appropriately equipped with the correct textbook, paper, pencil or pen. It is expected that the students will show some approximation of this behavior when they enter the program and they will acquire one hundred percent achievement on this particular behavior.

The second (2) behavior which we regard as a terminal behavior is that the student is <u>able to follow the figure pattern</u> as it is structured by the teacher and the class, whether the stimulus event which is most important at any given point in time is an auditory, a visual, or a motor pattern. If this student were involved in a game, such as baseball or football, we would describe him as the player who is able to keep his eye on the ball. It means that each student knows exactly what is going on in the classroom all of the time and would agree with the teacher as to where he should be directing his attention.

The third (3) of these behaviors is probably the result of the second. The third behavior is that the student will respond appropriately with the desired verbal or motor behavior, as the teacher has directed with an <u>appropriate time lag</u> (desired here is what is desired by the teacher). This behavior is applied to specific responses. The term "appropriate time lag" is utilized in order to indicate that too

rapid as well as too slow responses are not approved. As to whether or not the student has estimated an appropriate time lag could be measured by the responses which the teacher gives; for example, the teacher might say, "Now, stop and think, wait and organize your answer before you say anything", "now think", or "listen carefully, and don't answer until I tell you", so that the teacher is structuring the time lag.

The fourth (4) behavior which can be observed while students are in a class is that the student does not engage in extraneous behavior which interrupts his task orientation or the task orientation of any other participant in the learning situation. When we say extraneous behavior, we are describing either verbal or motor behavior which tends to distract the student, or anyone else, from the figure pattern which the teacher has indicated is the task for the class at that time. I have learned that these extraneous behaviors are a function of the amount of anxiety which the student is experiencing in a situation. We have learned that as the students stopped being fearful in a learning situation that the extraneous behaviors were markedly diminished. We do not expect these behaviors will drop out of the student's usual performance in the classroom. It is an important part of teaching the teacher in this program, that the teacher realize that extraneous behaviors will occur. However, the important dimension of the extraneous behavior is whether or not it disrupts the student or others from the learning task.

The fifth (5) behavior which can be observed in a classroom situation is whether or not the student is eager to learn more. This behavior can be said to occur when the student asks such questions as, "Can we do more of this tomorrow? Could we do this instead of arithmetic? I really like it," or "This is the first time I've really understood; boy, I sure like this!" or "Could I take this book home and finish it? I think I can really get this right now". What we are saying is that we will look at the behavior of the student and decide whether or not this indicates that he is eager to learn more in a given area.

A sixth (6) behavior which could be observed in the classroom is that the student shows concern for the needs of the teacher and of his peers. The behaviors which would indicate that the student is having this sort of experience would be if he picks up a pencil the teacher has dropped or goes to get a book for the teacher; if he volunteers to go for coffee for the teacher; if he volunteers to let one of the other students share his lunch, share his book, or offers to assist another student to learn spelling, or to work a problem, or to write a paper. What we are describing by this behavior is that the student has lost enough of his egocentric behavior and enough of his fixation upon his own needs to be independent enough so that he is able to observe the needs of others and to assist them to meet these needs. We think this is a mature behavior, and one which we would like to

see emerge in these students who have been characterized by immature behaviors.

A seventh (7) behavior which goes along with the sixth is that the remarks that the student directs to his teacher and his peers indicate respect and friendly reactions toward these individuals. In order to indicate that this behavior is occurring we would like to describe some of the things that boys and girls do say to other boys and girls and to teachers which we categorize as indicating respect and friendly reaction. I would think that we could best define this by recording some of the things that students say to each other and to the teacher and notice that negative responses to learning situations in the group tend to diminish and positive responses tend to increase as these students improve.

Another (8) behavior which can be observed in a classroom and an unexpected or unusual one (or which seemed that way when we started to teach this kind of student) is that the student who has been quite alienated where school work is concerned suddenly seems to have acquired the role of a self-appointed policeman and reminds other students of appropriate behavior in the class. This is not a matter of usurping a teacher's role but is rather one of acting as an assistant to the teacher in maintaining the order which is adequate to permit the teacher to teach or to permit the students to carry out their assignment.

A ninth (9) behavior which is rather closely related to seven and eight is general courtesy. This behavior also may occur when the teacher is not in the classroom or is occupied with other students. I would think that we are talking about behavior which would be very much the kind of thing that we might see defined under social graces or in a book like Amy Vanderbuilt's talking about what people do in various social situations. I think we are talking about such behaviors as, being able to set the table neatly, using a napkin frequently so as not to have food all over one's face, seeing that there is a chair pulled up to the table for a teacher, letting a teacher precede one through the door. These may sound like rather old-fashioned kinds of things and perhaps table manners and courtesy should go into the same behavior since I seem to be describing quite a few of the things that we ordinarily think of as table manners. We would look for behaviors like: when a dish of candy is offered to a student that he take only one piece (or more if someone asks him, but his first response is to take only one piece), that these students are heard to say "please" and "thank you" when they are asking for something or receiving something.

A tenth (10) behavior which I would think would be noticed in the classroom situation is a well-modulated controlled voice. I believe that this can be an objective for the program. I think that we can assume that most of the students coming into a teaching program such as this will either talk too loudly or too softly.

The eleventh (11) behavior is grooming. This is something that could be measured perhaps as the student appears at the beginning of the class, or at the end of the class, or throughout the three hours that the students are in our building. I believe there should be some sub-behaviors listed under grooming. Some of those I think are: relatively clean hands, clean face, hair combed, shirttail in, zipper up on the trousers, shoes tied. Perhaps there are some others that we could add to this but I would think this list is adequate. One of the things that we have observed with these students is that they are not particularly well-groomed when they start coming to us. Finally, it is as though grooming is something which is now controlled within the individual. While it may not be perfect, it is a consistent sort of grooming and one which is adequate for the classroom situation.

A twelfth (12) behavior is one which may not be observed if we take only a small sample of the behavior which is demonstrated in the entire class. This behavior is the way in which the student reacts in the sports or games situation. It is characterized by his playing according to the rules of the game and not asking for special privileges for himself or for his team. It is usually described by such terms as good sportsmanship. It means that the student is able to accept losing as well as winning in good grace.

A thirteenth (13) behavior which is quite closely related to behavior in sports, but is separate enough, I believe to be designated as a separate

category is the behavior of not cheating in academic areas. This would apply to daily work and to test situations equally well. It indicates that the student is willing to try to solve problems as best as he is able without acting as though he thought the only task was to get the right answer. I believe we are saying with this behavior that the student has a value system which is geared to "learning how to learn" rather than learning how to get the right answer, and that it has become important for him to understand what is going on in a teaching-learning situation rather than to get the teacher's approval by having a right answer.

The other two behaviors (14 and 15) which could be measured by looking at the students' papers over a period of time are good spelling and good handwriting. I would think that good spelling for these students would be the ability to spell the words which are used in the grade in which the student is placed. I believe that good handwriting would be the handwriting which shows consistency in such areas as form, spatial relationships, position in space, and that the handwriting is always legible.

The final two behaviors (16 and 17) which we listed in our description of terminal behaviors for this teaching program can also be evaluated by testing, by teacher observations, or by looking at the success the student has met while dealing with the sequence of teaching which the teacher has presented. The first of these is that the student acquires

knowledge at the rate at which the teacher intended he would acquire the knowledge. This behavior is to be measured over a period of time - it could be every month - it could be every six weeks, and could be measured by general achievement testing, or by readministering the individualized testing which was done with the students as they entered the program. The final behavior which we have described in listing expectations for the students in the program is memory or that the student develops a retrieval system which permits him access to knowledge which he has acquired over a period of time. One of the characteristics of children with learning disabilities is that they perform very poorly. The behavior which we would like to see in these children is consistency in behavior. We would like to see <u>this</u> memory function as one in which once the child has learned such things as the way sentences are written, or the way paragraphs are analyzed, or the way in which a summary is written that he will not forget these general processes and will be able to perform these functions in any teaching-learning situation where they are appropriate.

Outline of Observable Behaviors

1. Student comes to class with the appropriate equipment for the activity.
2. Student is able to follow the figure pattern - auditory, visual or motor.
3. Responds appropriately with the desired verbal or motor behavior with appropriate time lag.
4. Student does not engage in extraneous behavior which interrupts his task orientation or any other participant in the learning situation.

5. Student is eager to learn more.

6. Student shows concern for the needs of the teacher and of his peers.

7. Remarks the student directs to his teacher and his peers indicate respect and friendly reactions toward these individuals.

8. Student reminds other students of appropriate behavior in the class.

9. General courtesy.

10. Well-modulated controlled voice.

11. Good grooming.

12. Good sportsmanship.

13. Not cheating in academic areas.

14. Good spelling.

15. Good handwriting.

16. Student acquires knowledge at the rate the teacher intended.

17. Develops a retrieval system which permits him consistency in behavior.

A Typical TUGS Student

The most succinct description of a typical TUGS child which I have found appeared in a monograph published by the California Association for Neurologically Handicapped Children (1965). It stated:

> "His appearance is normal, his intelligence is average or better; he receives love and attention; yet, he is a menace to his neighbors, a disruptive influence in the regular classroom, an unsolved puzzle to his parents. He cannot perform. He actually sees and hears things differently."

The children that have been taught in the TUGS programs for the past two years have appeared normal to observers until they attempt a task which requires a level of academic skills which would be appropriate for children of their age. As soon as the TUGS students begin to read, write, do arithmetic problems, or follow a sequence of logical reasoning, it becomes apparent to the observer who is knowledgeable of the grade levels skills in public schools that TUGS students represent the range of achievement which is ordinarily found at the beginning of the second semester in first grade classrooms. Observers most frequently ask the question, "How could their teacher let them get like this?" The answer to that question is an exercise in heartbreak with variations on the theme for the individual child's history. Each of our students started in kindergarten as an alert, happy child who wanted to go to school. After a few days each one learned that school was not a place where he could expect to receive many rewards. The hypothetical child who is representative of TUGS children learned almost immediately that he did not fit into the teacher's expectations for kindergarten children. His speech required correction; he could not sit still and listen; he could not color inside the lines; he could not remember the way the letters in his name went so that Bobby = Bodby = Bodpy = Bobd, his hands were usually dirty, and he could not skip. He knew he was not one of the group; the other children knew, and his teacher knew. He frequently played alone or wandered aimlessly

about the classroom. The teacher had a conference with his mother. His mother talked to the pediatrician. They agreed that he would "become more mature" so he went to first grade the next year.

His first grade experience was a full day of the same rate of failure which he had encountered in kindergarten. It was decided that he was not ready for reading after all so he repeated first grade. He entered second grade able to print his first name, read the pre-primer, and to count to twenty. It was his fourth year in school; he had no friends; he could not do grade level work; his first grade teacher was in despair about her failure to teach him; and his second grade teacher rapidly developed guilt feelings because she could not find enough time "to teach him as he should be taught." He was no longer going to speech class. Late in the second grade he was referred to the Department of Special Education for possible placement in a special class. He was seen by the school psychologist, the school social worker, his pediatrician, a pediatric neurologist, and an ophthalmologist. The results were reviewed soon after school started in the fall. He was in third grade and in his fifth year in school. He was declared eligible for placement in the Perceptual Development Program, but the class was filled so he remained in the regular classroom. Since he was very near his tenth birthday when he would be too old for the Perceptual Development Program, he was referred to the remedial reading teacher. He was tutored three times each week for one-half hour by the reading

teacher. At the end of the year, his instructional reading level was first grade; he repeated third grade.

The year that he entered fourth grade he was enrolled in the TUGS program. He knew that he could not learn, and he became very frightened whenever he was required to read aloud or to answer questions. He had acquired many behaviors which interferred with his being able to learn even if the teaching was at his achievement level. He had learned not to pay attention to his teacher, his textbooks, or his classmates except to make jokes or to register complaints. Since he could not master his environment as it was presented to him by his teacher, he had changed the environment so that he no longer was expected to do the assignments which the other children did. He was unhappy at home and at school. His behavior fluctuated between clowning and bitter disillusionment. He could not understand why he was different than the other children and no one could help him. He viewed himself as "one who can't." He was easily defeated and no longer tried any task at which he could not be successful immediately. In short, he had a poor attitude toward school, a poor self-concept, and poor academic skills. In summary, the child in the TUGS class has been in a regular classroom, has had special help with reading, does not fit the criteria for any special education program, has average or better intelligence, and has not been able to acquire academic skills or knowledge in the regular classroom.

ARCHITECTURAL REQUIREMENT

The classroom for the TUGS Program must be large enough to provide adequate space for the twelve students, the teacher, and teaching aide to participate in the learning program without disrupting each other. Space requirements can be maximized or minimized by the activities which are included in the teaching plan and by the kinds of grouping which are utilized. The teaching plans for the academic year 1968-69 will conform with the space which is available in the Reading classroom at Oakland Schools. Tables and chairs which are a comfortable height for children ages 10-12 years are necessary for the classroom. Carpeting should be obtained to deaden the amount of noise picked up by the microphones. We will use a four-drawer file and a bookcase for materials, supplies, and the children's working papers. The drapes should be lined with opaque material so that the room can be darkened when projectors are used. A screen is necessary also for use with the projectors.

MATERIALS NECESSARY FOR TUGS PROGRAM

The content of the academic areas being taught will be taken from textbooks which are available since the staff has neither the expertise nor the time to prepare a well-planned sequential teaching program for social studies, mathematics, and science at several grade levels. We will require an adequate number of the Silver Burdette Social Studies texts for grades one, two, and three and of the Harcourt

Brace Elementary Mathematics Series for grades kindergarten, one, two, and three. Science materials will be purchased from the Cranbrook Science Institute or obtained from the Oakland Schools Science consultant. We will require two tape recorders with tapes, headphones, an overhead projector, the tachistoscopic projector, a record player, and a film strip projector for the classroom. We will require a 16 mm sound film projector occasionally.

Stationery supplies which will be required are:

handwriting paper	transparencies
pencils	file cards
felt markers	paper cups for beverages
rulers	paper napkins
folders	paper towels
erasers	two large sponges
pencil sharpeners	chalk

BACK-UP SERVICES

During the research and development stage of the TUGS program, a multi-disciplinary team will be required to assist the teacher and the teaching aide. Since every effort will be made to identify the qualities in the program's teaching-learning process which are critical for effective change in the students and to quantify these qualities, continuous observation will be necessary. The observation will be effected through the use of closed circuit television and a video tape recorder. Two members of the Reading staff will observe the teaching session and measure the interaction in the classroom using one of the systems available for that type of analysis. (Mirrors of Behavior, 1968). The

observer will activate the video tape recorder (VTR) when a critical incident is occurring in the classroom. In addition to the two observers, audiovisual technicians will be necessary to insure the appropriate functioning of the equipment. The Systematic Studies Staff will assist with the development of the interaction analysis instrument. They will assist also with the research design and the analysis of the pre-test, post-test, and teaching-learning process data. The pre-test and post-test data will be supplied by the school diagnostician, school social worker, classroom teacher, reading clinician, Speech and Hearing Clinic at Oakland Schools, and the Neuro-Educational Unit at William Beaumont Memorial Hospital. This multi-disciplinary input of data concerning the child requires the professional staff in the local school districts, at Oakland Schools and at the Medical Unit to back-up the classroom teacher and the teaching aide. An instrument known as SimulaR which was developed at Michigan State University (Levine, 1968) will be used also to gather data regarding the learning behaviors of individual students. Since SimulaR is at the stage of Research and Development itself, its staff of script writers, property man, systems analysis staff advisor, technical advisor and technicians will back-up the teacher and teaching aide.

A second major area in which the teacher and teacher aide will require back-up assistance is the selection and preparation of materials for use in the classroom. The teacher will consult with members of the Oakland Schools staff whose areas of expertise are social studies,

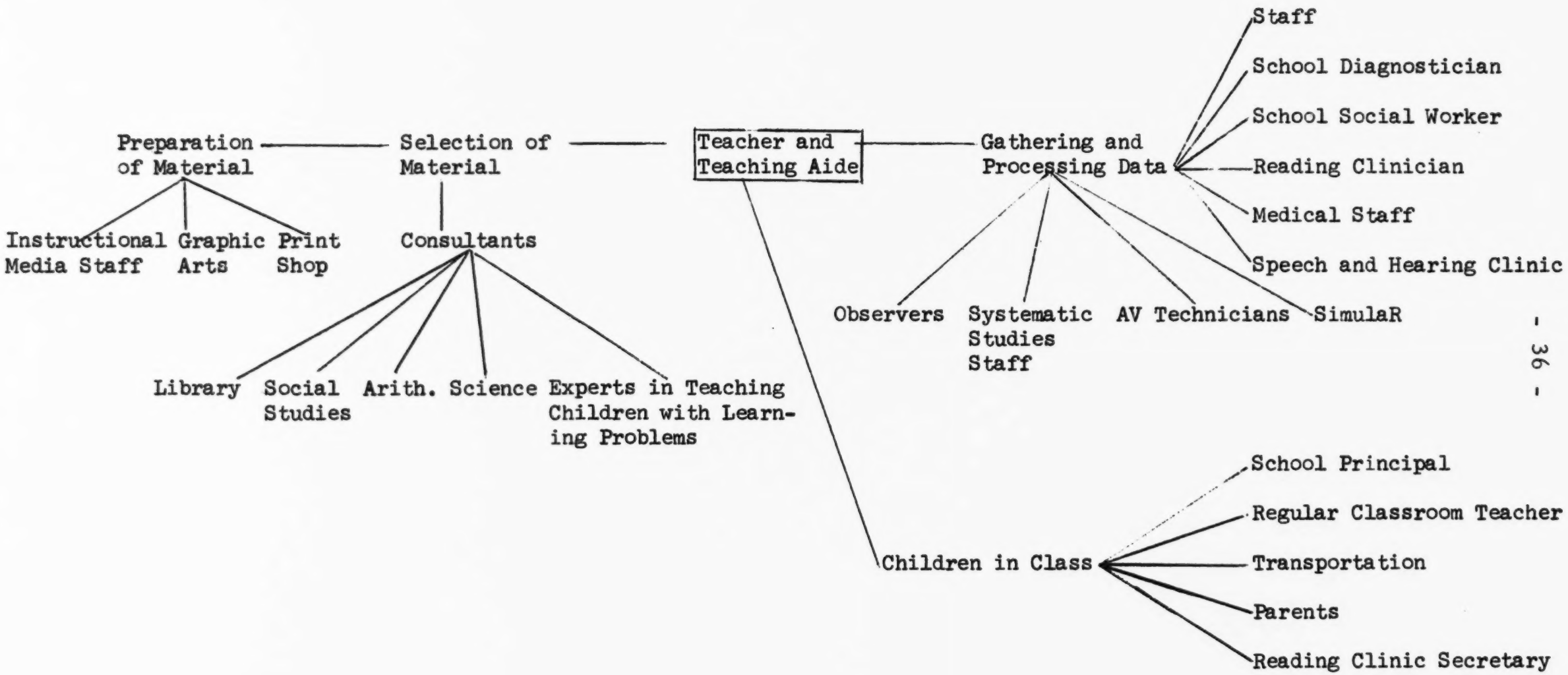
mathematics, science, library offerings, or teaching children with learning problems. The teacher will depend upon the Print Shop, Graphic Arts, and Instructional Media Staff for assistance in the preparation of materials.

The third major area in which the teacher and teaching aide will require back-up assistance is the maintenance of the children in the classroom at Oakland Schools. This will involve the local school principal, classroom teacher, and transportation staff, the parents, and the Reading Clinic Secretary.

Teaching Program for the TUGS Students

The older student who has a severe learning disability has learned to use his time in the classroom in many ways. He often asks many questions, interrupts the teacher and attempts to distract her and the entire class from the teacher's lesson plan. If we were to categorize this child's major type of personality development, we would say that he is at Erikson's level of initiative. These students are highly creative. However, the learning tasks of elementary school require conforming behaviors. The English alphabet has twenty-six letters, a word is the word that it is, in spelling and in reading, two plus two is equal to four. These are mundane facts, but they are essential. Such esoteric achievements as critical thinking and creativity add pleasant variety occasionally to the life of a student. However, the major portion of his life in the academic world and the adult world

BACK-UP SERVICES



of work will require him to conform to such prosaic behavior as correct spelling, reading for the facts, and approved social interactions like saying please or thank you. With this philosophy as our bias, we have planned the teaching program for the TUGS for the purpose of forcing our students to conform to the demands of their society. All of the teaching is directed toward the end that these children will read, write, cipher, and act exactly as children of their age are expected to act at their age and at their grade in school.

I cannot apologize for such a "reactionary" objective. The stakes are too high for our children. Failure to achieve this degree of skills can result only in failure in the world outside of school. The illiterate adult can survive in our society only as an inmate of an institution or as a dependent person.

Our teaching program will be developed around models which will be adaptable for many different specific teaching tasks. One of the most critical areas is to teach generalizations which include x number of concepts. In perception theory, this is referred to as learning the standard. There are many standards to be learned in school: the alphabet, sight vocabulary, spelling, addition facts. The following technique has been useful to us in teaching many standards to TUGS students.

Reading skills are taught to TUGS students using social studies materials. This procedure is intended to meet the dual purpose of

Model for the Acquisition of a Standard

Massed practice

1. Present the standard

2. Encourage students to develop a cue system which will indicate the correct response every time for them

3. Practice recognition, recall, and reproduction of the standard refining the response until the 100% level of correct response is achieved.

4. Drill on recognition, recall, and reproduction of standard until level of overlearning will assure dependable retrieval.

Distributed practice

Establish review schedule that will maintain the correct response.

a. Spaced drill using material similar to #4.

b. Incorporate this standard into learning of a more complex standard so that drill will be automatic.

teaching social studies concepts and the skills which are the component parts of the reading process. The primary objective for reading is that the students will be reading at grade level with reliable sight vocabulary and good comprehension of the type defined as acquisition of facts. We are attempting to achieve this objective by the following sequence of contributing objectives and teaching techniques:

1. He knows the letters of the alphabet by sight and by sound and all configurations of each letter.

    a. Step one is to learn the standard sound for each letter.
    b. Step two - learn the standard visual pattern for each letter printed upper case.
    c. Step three - learn to recognize the printed lower case standard for each letter.
    d. Step four - learn to write upper and lower case cursive standard for each letter.
    e. Step five - learn to equate sound with printed or written pattern for each letter.
    f. Teach as much about the letter as possible by using it in many different ways - initial, medial, terminal position in words and in combinations with other letters - diphthongs, blends and glides.

2. He can follow printed material when it is read to him.

    a. Child learns that each pause indicates the end of a word.
    b. Child learns to move to next word at each pause.
    c. Child uses black paper marker below line to help maintain his eyes on the line.
    d. Child listens to and follows along as tape recorder reads social studies book which is written at the student's instructional reading level.
    e. After ten minutes, stop the tape recorder and ask the student to read to you.
    f. List words that are unknown.
    g. Teach unknown word following steps used for teaching letters, i. e. teach sound and visual printed and written patterns of the word along with as many meanings

as possible.

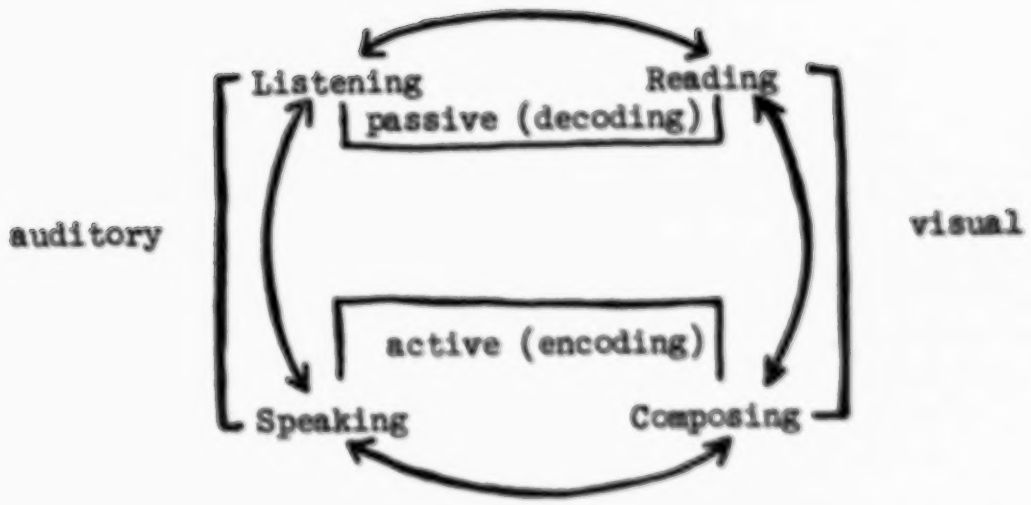
h. Use the word in sentences that students write in order to summarize what they have just read.

i. Permit students to listen to tape a second time and read back to you using choral reading.

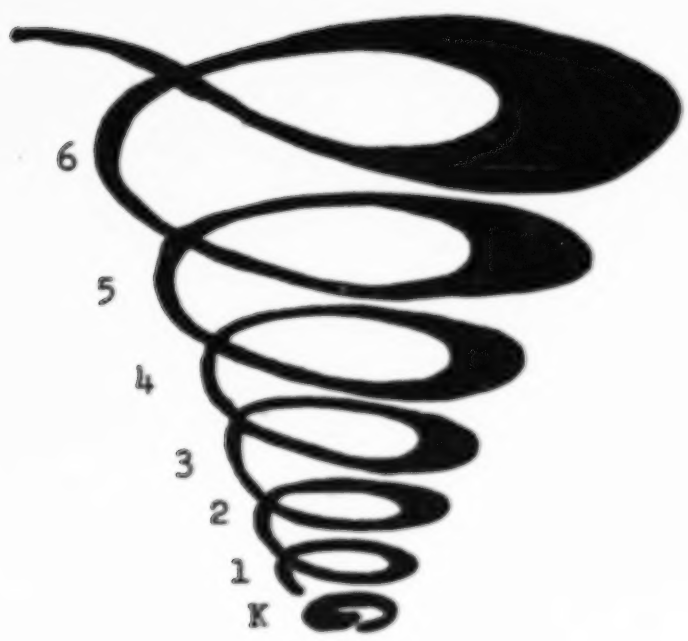
These steps will be followed each day in an effort to transport our students into the whole skill of reading. These are children for whom a part can become the whole. If we teach phonetic analysis, initial consonants, or context cues that is exactly what they will learn. They will resemble the child who had been carefully and meticulously taught word analysis skills. His response to "she" was a slow ssss - haaa - eeee. He could shorten the amount of time which he gave to each letter, but he could not effect a smooth blend of the three into a monosyllabic word. The examples of this disability have been ample to convince us that reading must be taught as a total process along with the total listening, speaking and written composition processes. All of our efforts will be directed toward teaching the entire language arts cycle rather than the units of structure of each component.

We have developed a model of the language arts sequence which we have found useful to assist us to explain the relationship between its component parts (see page 41). It is necessary that teachers understand that each process is related to each of the other processes and that various levels of sophistication are to be achieved at various levels of maturation. Consequently it is necessary to teach levels of listening - speaking - reading - composition - each day to assist the students to

A. LANGUAGE ARTS CYCLE



B. SPIRAL OF LANGUAGE



develop compatible skills for each process. It is also necessary to understand that each grade level of academic achievement requires a different level of the language arts cycle. We have used a sketch of an ascending spiral to illustrate this concept to teachers (see page 41 B).

In working with our own students and teachers, we developed the following model for a daily lesson plan for language arts.

Teaching Language Arts

Content of material used for the lesson is to be congruent with the student's level of <u>oral</u> <u>fluency</u>.

1. Have their attention.

2. Each child knows place and knows how to follow -

   black markers
   spacing
   word recognition

3. Each child is responding appropriately all of the time - If not, stop and correct behavior - Never mind about his values or his parents; just worry about teaching reading!

4. Listening, speaking, reading, and writing activities each period:

   Listening - follow directions
   repeat words
   answer questions

   Speaking - discussion
   extending ideas to incorporate sight vocabulary into speaking vocabulary
   this may require movies or field trips to provide experiences the children have not had

   Reading - sight vocabulary

   comprehension - facts
   characters' personalities
   sequence of action
   objectives

fluent delivery < words
respect for punctuation

Composing: progression -

1. Write word that you hear _____.
2. Write word that means _____.
3. Write what it said about _____.
4. Write what you think about _____.

Sequence of Concepts for Social Studies

The Silver Burdette first grade social studies text is intended to give children an understanding of why families exist and of the different types of families. The entire book can be outlined in ten questions.

1. What is a family?
2. What are the different kinds of families?
3. What needs do families have?
4. Why do families require shelter?
5. What are the kinds of shelters that families use?
6. How do families obtain food?
7. Why do people wear clothing?
8. How do people obtain clothing?
9. How do families live in the United States?
10. How do families plan?

The answers to the questions, the location in the book, and the sequence for teaching is outlined on pages 45 and 46. The students will be helped to understand the organization of the text by discussing the author's

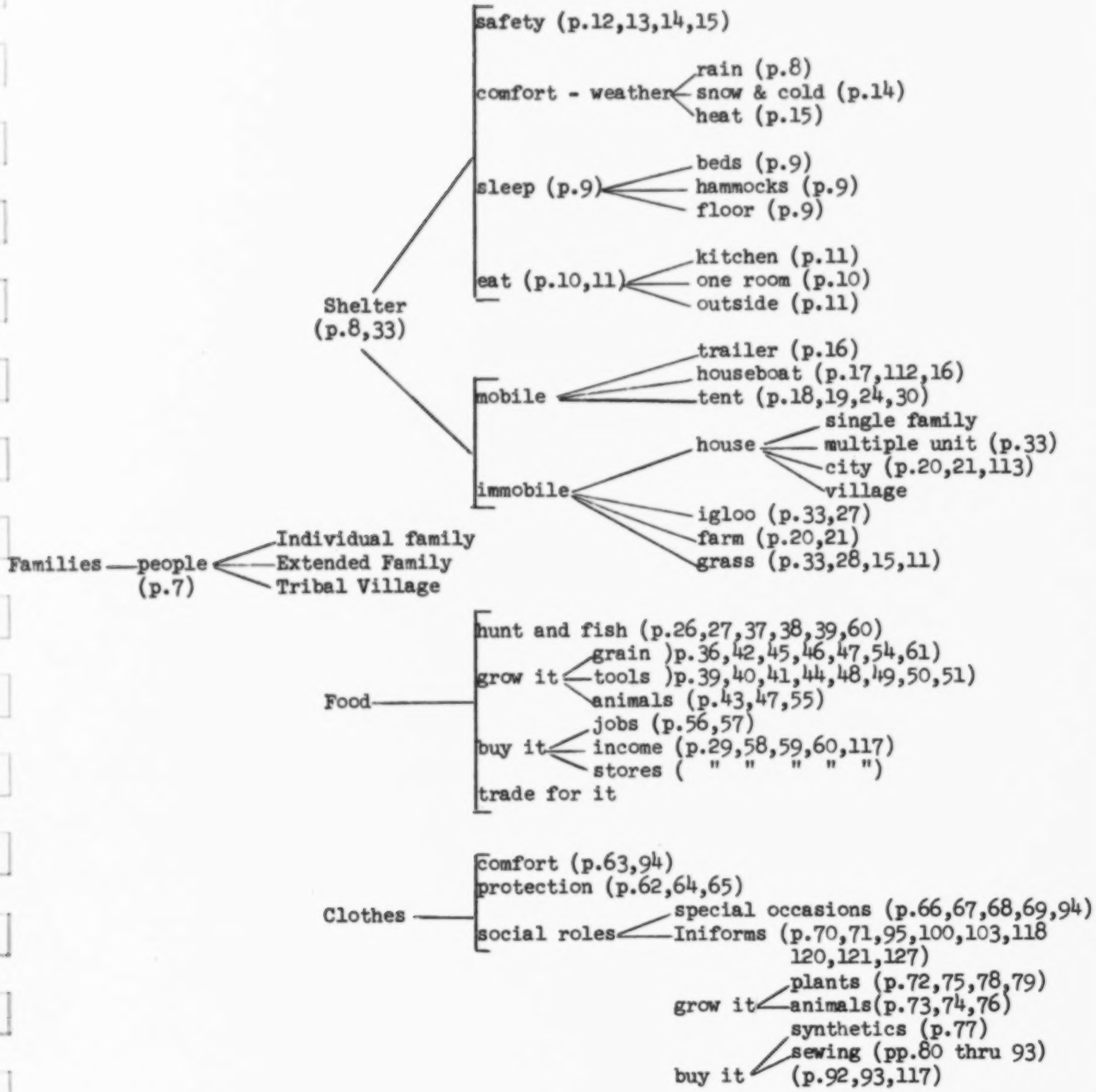
objectives with them in their language. We will know that they understand the book when they are able to explain the author's objective to us. The daily teaching plan will follow the model outlined under the objective of reading at grade level with a reliable sight vocabulary and with valid comprehension.

Other grade levels of this text or other social studies materials could be outlined in this same way to facilitate teaching.

Teaching Arithmetic to TUCS Students

Since most of arithmetic is dependent on knowledge which is more simple, it is necessary to individualize the arithmetic instruction for each TUCS student. We have been using the Harcourt, Brace Elementary Mathematics Series for several reasons: the sequence of presentation of mathematical processes corresponds to progression which occurs in public schools and because the vocabulary used does not become obsolete as the student completes a grade level and moves on to the next one. It is necessary that students with learning disabilities acquire words which permit them to talk about the work that they are learning to do. The Harcourt, Brace Series introduces the appropriate term when the student encounters the concept or process for the first time. In this way the student acquires a sophisticated vocabulary by learning a few words every week. He does not learn labels which he will be forced to discard later because they are too

FAMILIES AND THEIR NEEDS



FAMILIES AND THEIR NEEDS
(continued)

THE UNITED STATES (p.96)

rules — choose representatives (p.104,105,106,107)
plans — President (p.108,109)

loyalty - flag (p.110)
Pledge of Allegiance (p.111)

different places to live (p.112,113)

work - earn money - buy for family (p.114 thru 121)

have fun (p.122, 123,70,71,69,68,96,97,101,124,125)

How people make this a good place in which to live ?
(p.124,125,126,127)

CLIMATES

Arctic (p.63)

Eskimo (p.14,22,23,24,25,26,27,30,31,32,33,94)

Tropics (p.9,11,15,18,19,32,33,35,60,61,64,65,66,72,73,78,79,94)

Temperate (other pages)

unsophisticated for the secondary grades. Since children with learning disabilities have difficulty learning any word, we would like to try to teach them words which will not interfere later with their progress.

The sequence in which mathematical processes are taught to TUGS program students is: counting, adding one digit numbers, adding two digit numbers, adding two digit numbers with carrying. These elementary processes are taught by using real objects such as: apples, spoons, chairs, boys and girls, or books. We attempt to give the children such a wide range of experiences at the sensorimotor level that they are able to quantify without making any errors. While learning addition, the students will learn the symbols for "is equal to", "is not equal to", "is greater than", and "is less than". The teaching method used to assure the students learning the symbols is the technique outlined on page 38 which describes the acquisition of a standard. Along with the process of addition, the children will be taught the concept of the equation. The "addition facts" for each numeral will be presented as an equation which is always correct if each side of the equation is changed in the same way: i. e. :

3 + 0 = 3	or	n + 0 = n
2 + 1 = 3		n - 1 + 0 + 1 = n
1 + 2 = 3		n - 2 + 0 + 2 = n

The students will be taught this behavior through practice with real objects, pictures, and drill sheets.

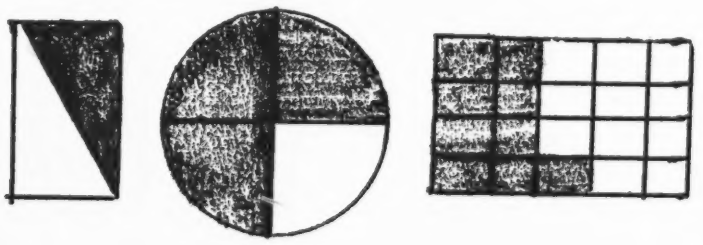
After counting and addition have been learned, the students will

be taught the definition of a set, subtraction of one digit numbers, subtraction of two digit numbers, subtraction of two digit numbers with borrowing. Learning subtraction will depend upon the student's ability to reverse the process of addition. If students are not able to succeed we will use Piagets' experiments for teaching equivalence and reversibility. When these processes have been learned, we will teach multiplication and division as a different way of adding and subtracting. The introduction of each new concept will require massed practice of that skill accompanied by distributed practice of the previously acquired skills. The students will work their way as rapidly as possible through the sequence of the Harcourt, Brace series. When we reach fractions, we will teach the concepts using the following outline prepared for our students by Dr. Robert Schulte at Oakland Schools.

Fractional Numbers

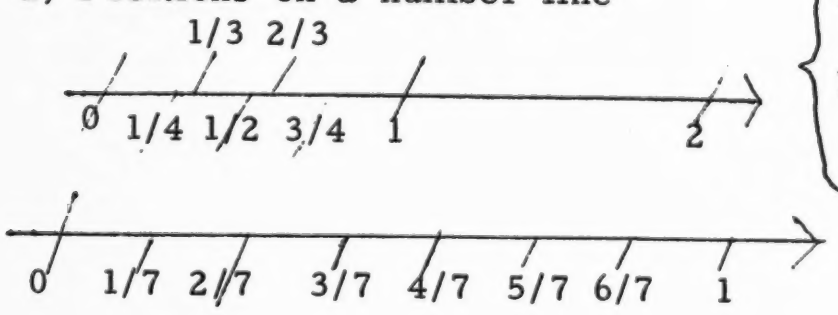
A. Representations of Fractional Numbers

1) Parts of a whole



Denominator--How many parts in a whole.
Numerator--How many parts one is concerned with.

2) Positions on a number line



Denominator--How many segments in a whole unit.
Numerator--How many segments one is concerned with.

B. Equivalent Fractions and Equivalence Rows

1/2=2/4=3/6=4/8=5/10=.....; 2/9=4/18=6/27=.....

C. Ordering Fractional Numbers

(Using the number line as an aid)

2/3	3/4	(Use < or > in the circle to make a true statement)
3/5	4/7	
1/6	1/8	
2/9	1/3	

D. Adding Fractional Numbers (Sums less than one)

1) Like Denominators (Using pictures as aids)

1/3 + 1/3 = 2/3

7/10 + 2/10 = 9/10

Generalization (not necessarily to be verbalized)

a/b + c/b = (a+c)/b

2) Finding Common Denominators

1/7 + 2/5 = 5/35 + 14/35

3/8 + 1/4 = 3/8 + 2/8

3) Adding Fraction Numbers With Unlike Denominators

1/3 + 2/5 = 5/15 + 6/15 = 11/15

3/10 + 1/5 = 3/10 + 2/10 = 5/10

Generalization

a/b + c/d = (ad + bc)/bd

4) Reducing Fractions to Lowest Terms

4/12 = 1/3; 6/39 = 2/13

E. Subtracting Fractional Numbers (Sums less than one)

1) Common Denominators

3/4 - 1/4 = 2/4; 5/7 - 2/7 = 3/7; a/b - c/b = (a - c)/b

2) Unlike Denominators

4/5 - 1/3 = 12/15 - 5/15 = 7/15, etc.

a/b - c/d = (ad - bc)/ bd

F. Fractions Greater Than One

1) "Improper" Fractions

7/4, 3/2, 5/3, etc.

2) "Mixed Numbers"

3 1/7, 2 4/5 (a b/c means a + b/c)

3) Practice in Changing Form

3/2 = 1 1/2; 7/4 = 1 3/4; etc.

G. Adding and Subtracting Fractional Numbers (Including Improper Fractions and Mixed Numbers)

1) 13/7 - 5/7 = 12/7

2) $\begin{array}{r} 2\ 1/7 = 1\ 8/7 \\ -1\ 4/7 = \underline{1\ 4/7} \\ \hline 4/7 \end{array}$

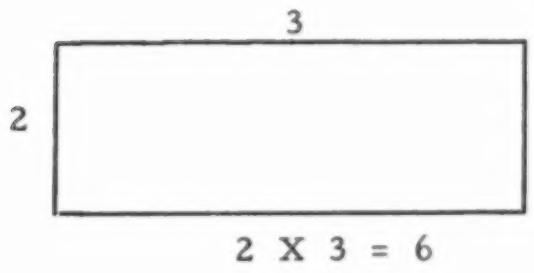
3) 12/5 - 3/8 = 96/40 - 15/40 = 81/40

4) $\begin{array}{r} 5\ 4/3 = 5\ 8/6 \\ -2\ 1/6 = \underline{2\ 1/6} \\ \hline 3\ 7/6 \end{array}$

5) $\begin{array}{r} 6\ 2/5 = 6\ 6/15 = 5\ 21/15 \\ -3\ 4/3 = \underline{3\ 20/15} = \underline{3\ 20/15} \\ \hline 2\ 1/15 \end{array}$

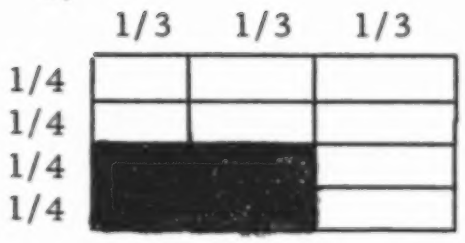
H. Multiplying Fractional Numbers

1) Review of Multiplying Whole Numbers to Find Area



2 X 3 = 6

2)



1/4 X 1/3 = 1/12

2/4 X 2/3 = 4/12

3) "1/3 of" means "1/3 X"

4) 3/7 X 2/5 = 3 X 2 / 7 X 5 = 6/35

Generalization:

a/b X c/d = aXc/bXd

5) $\frac{\cancel{3}^{1}}{\cancel{5}_{1}} \times \frac{1}{\cancel{5}_{\cancel{12}_{4}}} = \frac{1}{4}$

I. Division of Fractions

1) Notion of Reciprocals

3/4 X 4/3 = 1

2/7 X 7/2 = 1

4/5 X ☐ = 1

9/5 X ☐ = 1

2) $3 \div 2 = 3/2$

$9 \div 7 = 9/7$

Generalization: $a \div b = a/b$

3) Complex Fraction Technique

$$3/4 \div 7/8 = \frac{\frac{3}{4}}{\frac{7}{8}}$$

Generalization: $a/b \div c/d = \dfrac{\frac{a}{b}}{\frac{c}{d}}$

4) $\dfrac{\frac{2}{3}}{\frac{5}{7}} \times 1 = \dfrac{\frac{2}{3}}{\frac{5}{7}}$ $\qquad \dfrac{\frac{2}{3}}{\frac{5}{7}} \times \dfrac{\frac{7}{5}}{\frac{7}{5}} = \dfrac{\frac{2}{3} \times \frac{7}{5}}{1} = \frac{14}{15}$

Generalization: $\dfrac{\frac{a}{b}}{\frac{c}{d}} \times \dfrac{\frac{d}{c}}{\frac{d}{c}} = \dfrac{\frac{a}{b} \times \frac{d}{c}}{1} = \frac{aXd}{bXc}$

5) Common Denominator Technique

$$\frac{3}{5} \div \frac{2}{7} = \frac{3}{5} \times \frac{7}{7} \div \frac{2}{7} \times \frac{5}{5} = \frac{21}{35} \div \frac{10}{35} = \frac{21 \div 10}{35 \div 35} = \frac{21 \div 10}{1} = \frac{21}{10}$$

Generalization: $\dfrac{a}{b} \div \dfrac{c}{d} = \dfrac{a}{b} \times \dfrac{d}{d} \div \dfrac{c}{d} \times \dfrac{b}{b} = \dfrac{aXd}{bXd} \div \dfrac{bXc}{bXd} = \dfrac{(aXd) \div (bXd)}{(bXd) \div (bXd)} =$

$$\frac{(aXd) \div (bXc)}{1} = \frac{aXd}{bXc}$$

6) Reciprocal Technique

a) $3/4 \div 5/7 = \square$

$3/4 = 5/7 \times \square$

$7/5 \times 3/9 = 7/5 \times 5/7 \times \square$

$21/20 = 1 \times \square$

$21/20 = \square$

b) $3/4 \div 5/7 = \square$

$3/4 = 5/7 \times \square$

$4/3 \times 3/4 = (3/4 \times 5/7) \times \square$

$1 = 15/28 \times \square$

$1 = 15/28 \times \boxed{28/15}$

$\square = 28/15$

Data and Evaluation

Admission to the TUGS program will require an interdisciplinary evaluation for each child. The following data are to be reported by the designated professionals.

School Diagnostician

- Wechsler Intelligence Scale for Children - all sub-tests
- House-Tree-Person
- Bender Gestalt

Reading Clinician

- Vision Screening and Evaluate Auditory and Visual Modalities
  - reception
  - integration
  - expression
- Academic Skills
  - Stanford Achievement
  - Botel Reading Inventory
  - Informal Reading
  - Informal Arithmetic
- Education History
  - grades repeated
  - tutoring and for remediation
  - special class placement
  - absence
  - change of schools

Physicians

- Physical Examination
- Hemoglobin
- Protein - Bound Iodine
- Neurological
- Electroencephalogram
- Psychiatric Evaluation

Speech Clinician

- Language and Audiometric

DATA DESCRIBING STUDENTS IN TUGS - Fall, 1968

Wechsler Intelligence Scale for Children

*Stanford Achievement Test

Boy	Information	Comprehension	Arithmetic	Similarities	Vocabulary	Digit Span	Picture Completion	Picture Arrangement	Block Design	Object Assembly	Coding	VIQ	PIQ	FSIQ	Word Reading	Paragraph Meaning	Vocabulary	Spelling	Arithmetic	Grade in School	Birthdate	Reading Level Ind.	Reading Level Inst.	Reading Level Frust.
1	11	13	9	12	13	X	X	13	13	X	9	7	3	5	29	25	55+	30	35	6	8/9/57	P	1 - 2	3
2	9	12	7	10	11	6	15	9	13	12	7	4	6	5	16	12	48	15	26	4	7/8/58	none	PP	P
3	7	7	6	7	7	8	6	7	8	11	9	1	2	1	23	18	22	22	20	4	11/15/58	none	PP	P
4	11	11	7	11	12	8	11	14	11	10	8	4	6	5	19	15	34	12	28	4	2/24/58	P	1	2
5	9	12	9	7	9	X	15	11	14	15	12	3	8	6	27	24	48	34	43	6	7/15/56	1	2	3
6	8	10	4	8	8	8	8	11	13	11	8	0	5	2	25	19	36	24	25	4	12/18/57	1^1	2^2	3^2
7	6	8	7	6	6	8	10	5	11	N. A.	10	1	3	1	18	15	36	17	28	4	9/15/58	none	PP	P
8	9	11	10	13	12	10	10	10	8	9	7	6	3	4	17	—	27	13	24	6	9/11/57	PP	P	1
9	9	7	6	7	5	7	6	8	7	11	6	1	1	1	27	18	48	23	24	6	8/18/58	P	1	2
10	8	12	12	10	12	8	8	8	11	11	10	5	4	4	17	16	52	24	35	5	6/30/56	P	1	2
11	5	6	8	11	9	5	9	12	10	9	4	1	3	2	17	16	23	15	21	5	10/29/57	none	PP	P
12	9	11	7	7	X	4	12	9	10	X	6	1	3	2	27	40	48	20	33	6	1/5/56	1	2	3

* Scaled Scores
** Grade Equivalent Scores
— unable to cope with test
X Not administered

I. Q. Code:
0 = 75 - 79
1 = 80-85
2 = 86-90
3 = 91-95
4 = 96-100
5 = 101-105
6 = 106-110
7 = 111-115
8 = 116-125

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